

Claims

1. A method of welding thermoplastic molded articles, in particular of contour-welding three-dimensional molded articles, comprising the following
5 features:
 - moving the join partners (1, 2) into contact in the vicinity of the outline (K) that is to be welded;
 - acting on the join partners (1, 2) in the area of joining by a clamping device (10, 10');
- 10 - exposing one (2) of the join partners (1, 2) to radiation in the welding area by a laser welding beam (3);
characterized by
 - additionally and simultaneously exposing the other join partner (1) in the welding area to electromagnetic secondary radiation (15) for temperature increase thereof.
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20 2. A method according to claim 1, **characterized in that** the secondary radiation (15) comprises at least beam fractions that deviate from the wavelength of the laser welding beam (3).
3. A method according to claim 1 or 2, **characterized in that** the secondary radiation (15) used is IR or UV radiation.
- 25 4. A method according to claim 3, **characterized in that** the IR radiation used is a medium-wave or a short-wave IR secondary radiation (15) preferably produced by a halogen radiation source (14).

5. A method according to one of the preceding claims, **characterized in that** the secondary radiation (15) is applied concentrically and synchronously of the laser welding beam (3).
- 5 6. A method according to one of claims 1 to 4, **characterized in that** the secondary radiation (15) is being led ahead of the laser welding beam (3).
7. A method according to one of the preceding claims, **characterized in that** the secondary radiation (15) is being focused.
- 10 8. A method according to one of the preceding claims, **characterized in that** the secondary radiation (15) and/or the laser welding beam (3) is being applied by a clamping device that is transmissive thereto, in particular a clamping roller (10').
- 15 9. An apparatus for welding thermoplastic molded articles, in particular for contour-welding three-dimensional molded articles, comprising
 - a clamping device (10, 10') for the two join partners (1, 2);
 - a laser welding beam source for producing a laser welding beam (3);
 - 20 - a laser welding beam guide (5, 35) for guidance of the laser welding beam (3) to one (2) of the two join partners (1, 2) in the welding area (18) between the two join partners (1, 2);
characterized by
 - a secondary radiation source (14) for producing an electromagnetic secondary radiation (15); and
 - a secondary radiation guide (16) for guidance of the secondary radiation (15) to the other (1) of the two join partners (1, 2) in the welding area (18).
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10. A method according to claim 1, **characterized in that** the secondary radiation (15) comprises at least beam fractions that deviate from the wavelength of the laser welding beam (3).
- 5 11. An apparatus according to claim 8 or 10, **characterized in that** the secondary radiation source (14) is an IR or UV radiator.
12. An apparatus according to claim 11, **characterized in that** the secondary radiation source (14) is a medium-wave IR radiator or preferably a
- 10 short-wave IR halogen radiator.
13. An apparatus according to one of claims 9 to 12, **characterized in that** the focus of the laser welding beam (3) is disposed substantially concentrically and synchronously of the area the secondary radiation (15) acts on.
- 15 14. An apparatus according to one of claims 9 to 12, **characterized in that** the area (19) the secondary radiation (15) acts on leads ahead of the focus (21) of the laser welding beam (3).
- 20 15. An apparatus according to one of claims 9 to 14, **characterized by** a focusing device (16) for the secondary radiation (15).
- 25 16. An apparatus according to one of claims 9 to 15, **characterized by** a clamping device that is transmissive to the laser welding beam (3) and/or the secondary radiation (15), preferably a clamping roller (10') through which passes the laser welding beam (3) and/or the secondary radiation (15) towards the welding area.